



BOOK SUPPLY CHAIN

The Process and Cost of Getting Teaching and Learning Materials to Kids

This tech brief presents the technical and logistical challenges encountered by the ACCELERE! project during planning, forecasting, title development, publishing, printing, procuring, and distributing training and learning materials to Congolese students, teachers, directors, and inspectors and provides recommendations for future implementers on keys to a successful teaching and learning materials supply chain in DRC.

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USAID's education strategy from 2011-2018 underscored the importance of getting more books in the hands of children¹ with the inclusion of texts as one of the Five T's (Time, Texts, Tongue, Teaching, and Testing) or goals to improve reading and literacy. The recent All Children Reading, *Reading MATTERS Conceptual Framework* expounds on the Five T's, and highlights the importance of "high quality texts and materials."²

ACCELERE!

The goal of A! I, funded by USAID and UK Aid, is to improve educational outcomes for girls and boys through improved teaching and learning in national languages and French, reduced barriers to education, and increased transparency of school governance structures.

CHALLENGES TO GETTING QUALITY TEACHING AND LEARNING MATERIALS IN THE HANDS OF STUDENTS AND TEACHERS

The Democratic Republic of Congo (DRC) is Africa's second largest country. It rivals the size of Western Europe, yet it has fewer than 2,548 miles of paved roads across its 905,400 square miles, which is approximately the same distance from Florida to Maine³. No printer in the DRC had the capacity to produce the more than 700,000 teaching and learning materials (TLMs), the number for the nearly 250,000 students, teachers, and directors targeted by the ACCELERE! I activity for the 2018-2019 school year in the requisite time frame.

The project's fixed timelines condense development, testing, printing, delivery, training, and distribution to a year, a process that typically takes more than two years, to allow development, delivery, use, and assessment of program activities. The demands of co-creation with the Ministry of Primary and Secondary Education (MEPST) and in-house materials development posed a challenge.

In the DRC, students begin schooling in one of four Congolese languages and transition to French in 3rd grade. A! I and the Ministry of Education language teams undertook development of TLMs in three Congolese languages and the transition to French in primary schools (grades 1-4) and accelerated learning centers (level 1-2).

In the DRC, the political context presents varying operational challenges. For A! I, co-creation with the Ministry in material development and improvement played an important role. Maintaining priority and generating buy-in with Ministry counterparts required careful planning and patience due to the myriad demands on Ministry staff time.

¹ Bender, Penelope. (2012). "Education Week 2012: Reading Improves with the 5 'Ts'." <https://blog.usaid.gov/2012/11/education-week-2012-reading-improves-with-the-5-ts/>.

² USAID. (2019). "USAID Reading MATTERS Conceptual Framework." <https://www.edu-links.org/resources/usaid-reading-matters-conceptual-framework>

³ Englebert, Pierre and Alma Bezares. (2019). "Where Does State Capacity Come from? Conjectures from Congo's Provinces." https://www.researchgate.net/publication/332739860_Where_Does_State_Capacity_Come_from_Conjectures_from_Congo's_Provinces#pf16

Given the DRC's heightened political, infrastructural, and environmental challenges, planning for the unexpected is critical to activity design. For example, seasonal rains from August to May complicate delivery on dirt roads and along rivers. In 2018, national elections affected timing of material delivery. In August 2019, the Government of the DRC (GDRC) announced free education in public schools, which led to an exodus of students and teachers from targeted private schools, and even some closings, only later to see the process reverse when parents realized students were not progressing in overcrowded public classrooms. Finally, the arrival of novel corona virus in March led to the delay in validation of Grade 4 materials due to the GDRC ban on gatherings over 20 people.

SOLUTION AND SUCCESSFUL PROCESS / INNOVATION

A!l's application of supply chain principles and processes adapted for the education sector demonstrates innovation and the practical implementation of USAID's approach to delivering TLMs. A!l's activities borrowed from best practices in supply chain management, and intentionally built upon proven supply chain principles used in the health and agricultural sectors for medical supplies or farm to market. In the case of A!l, application of supply chain principles in the areas of management, standardization, forecasting, and logistics proved paramount.

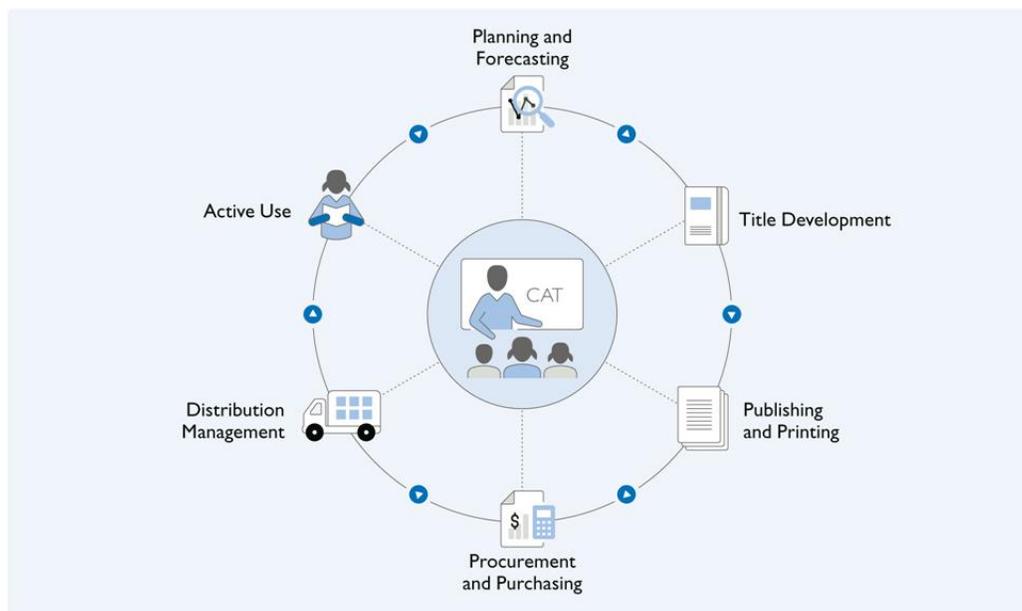
Supply Chain Manager. Allocating resources for a dedicated Supply Chain Manager to direct, coordinate, and systematize end-to-end operations and communications is a highly effective practice. A!l approached this by establishing an in-house TLM Task Force initially for the 2018-2019 school year. Led by the Deputy Chief of Party for Technical, it was comprised of representatives from the A!l quality materials development, procurement, operations, and monitoring, evaluation, and learning (MEL) teams. The weekly meetings provided the opportunity for the team to review timelines and request input needed to execute planned next steps. Additionally, the meetings allowed the team to better understand the supply chain's critical path and how each department's activities are dependent on or inform others.

Standardization. Standardization of tools, terms, events, and tasks improved supply chain delivery. It allowed those upstream (development and publishing) and downstream (delivery) to understand each other. Throughout A!l's implementation, critical standardized documents and tools included a list of book titles, delivery package (what each grade level classroom, director, teacher, and student should receive), school lists, and delivery receipts. These streamlined tools facilitated the development of delivery plans and A!l delivery receipt.

Supply Chain Forecasting. A key factor to supply chain effectiveness is the ability to forecast demand. A!l's TLM Task Force set book delivery windows and worked backwards to develop an implementation plan. The standardized school lists included director, teacher, and student population numbers, which allowed the team to create spreadsheets to forecast procurement needs. This, in turn, facilitated the procurement process to itemize quantities of each title needed and where they should be delivered. Once in a standardized format, the spreadsheet could be manipulated to provide the key content of the printer request for proposals.

A!I also used the standardized school list to build a distribution plan spreadsheet. This distribution plan indicated title quantities and allowed operations and logistics teams to pick and package materials for individual school deliveries as well as plan the necessary logistics. Additionally, it allowed the MEL team to prepare and print the joint operations and MEL delivery receipt that would be signed by school directors and parent association members to confirm receipt of delivered materials.

FIGURE I. ACCELERE!I book supply chain



Supply Chain Logistics. Drawing from best practices, A!I leveraged a few supply chain principles including as using multiple ports of entry, the processing of pick and pack to prepare for delivery, and warehouse positioning to improve logistics.

A!I used multiple ports of entry to position the books closer to the end user and used multiple transit methods based on best available transit routes. For the 2018-2019 school year, Kiswahili language books printed in India were shipped to Dar es Salam, Tanzania, and traveled overland to Lubumbashi, Goma, and Bukavu, where Kiswahili schools are located. A!I’s Lingala and Ciluba materials were shipped from India to Matadi (DRC’s port on the Atlantic coast) and driven to Kinshasa. There, the team packaged books for freight flights to Equateur and Kasai Central; previous experiences shipping via the Congo River, while lower cost, created delivery delays.

A!I developed and refined its pick and pack approach to preparing TLMs for delivery. Trainings for the 2018-2019 school year took place in August 2018 at multiple sites per province to minimize participant travel. While provincial staff were occupied with training preparation, training materials printed in Kinshasa were delivered to the A!I main office. There, staff and day laborers picked and packed TLMs, pulling the necessary quantities of each title by training site then boxed and labelled them. A!I could then easily ship packaged training materials directly to the provinces, allowing the provincial staff to

quickly dispatch the boxes to the appropriate training sites. This improved delivery time and reduced the potential for materials to go missing.

Pop-Up Distribution Centers. In order to reduce delivery time and improve logistics for delivery of books to schools in Kinshasa, A!I set-up “pop-up” distribution centers, temporary distribution centers that allowed A!I to preposition the TLMs closer to the students and teachers reducing the time delivery trucks would be stuck in Kinshasa traffic. These centers enabled A!I to deliver to more than 30 schools per day rather than 20 schools per day.

A!I Pop-Up Distribution Centers

A!I negotiated with beneficiary schools to provide an empty classroom to be used as the pop-up distribution center. These distribution centers stored TLMs and allowed teams of four to five (a site lead, inventory officer, and manual laborers) to pick and pack materials for delivery over the course of approximately 2 weeks at no charge.

Last Mile Delivery. A!I further improved TLM supply chain logistics by tweaking the delivery process in Kinshasa where traffic and sheer size of the distribution area was most complex for 2019-2020. Initially, A!I teams, including logistics and operations, worked with *Mobilisateurs de Lecture* (ML). The MLs are very familiar with the community and support 10-14 schools in implementing the various components of A!I activities. Initially A!I teams, including the MLs to assist with navigation, delivered TLMs directly to schools. After A!I shifted to the pop-up distribution model, directors and parent association members

Mobilisateurs de Lecture

A!I’s Mobilisateurs de Lecture (MLs) serve as extension agents for the project. Their knowledge of the community and school locations ensured the last mile of delivery would be completed with minimized geolocation issues.

met the teams at the pop-up distribution center to collect sealed boxes of materials. They opened the boxes only once they had returned to their schools, and in the presence of the MLs, and immediately distributed books to the students. This approach shaved weeks off book delivery.

COST OF GETTING TLMS TO KIDS

A!I hired a team of materials developers full-time to meet the activity’s materials development needs. These developers worked in language teams (Kiswahili, Ciluba, Lingala, and French) with four people per team. Development teams worked with their pluri-disciplinary colleagues (four ministry/university counterparts per language) to build ownership and sustainability. These teams also worked together on materials testing and served as master trainers during summer and mid-year refresher trainings.

A!I provincial, operations and MEL staff handled operations, logistics, and delivery with the help of the MLs. Planning and communication were essential during the six-week peak period of distribution, including approximately two weeks of preparation/staging and four weeks of actual deliveries in the field.

Costs for printing, expediting, and distribution can vary by volume paper quality, color vs. black and white printing, and binding. Additionally, savings are achieved with economies of scale, though costs plateau when printing volume reaches roughly 50,000 copies.

FIGURE 2. Cost to provide a student manual and workbook in the DRC

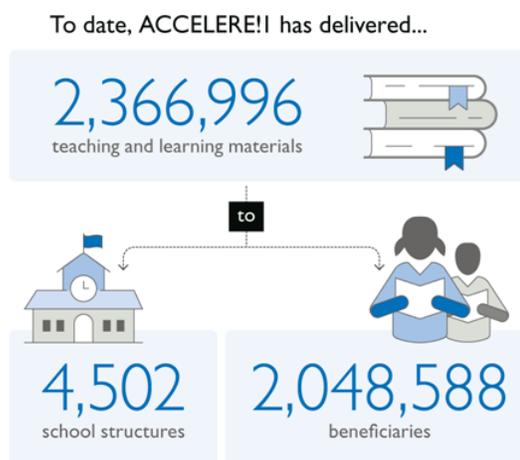


The cost per student is to provide both a student textbook and student workbook.⁴

On average, it cost \$3.90/child to provide quality TLMs in the DRC. Note this calculation does not include the time and resources to develop the materials themselves, labor or the costs related to quality assurance, time lost due to reproduction to meet quality standards, associated administrative costs, or redeliveries to account for the inevitable ebb and flow of student population numbers.

A! I IMPACT

Thanks to A! I’s innovative approach to using supply chain principles, 333,892 quality TLMs in Lingala, Ciluba, Kiswahili, and French were delivered to 1,561 schools (i.e., primary schools, accelerated learning centers, and vocational education centers) for the 2019-2020 school year. A! I’s TLM supply chain contributed to improved reading scores. Reading fluency and comprehension scores in A! I-targeted schools more than doubled between 2015 to 2018.⁵ Furthermore, zero scores (a way to measure non-readers) dropped from 76.45% to 65.05% between 2015 and 2018.⁶



The co-development approach A! I used developed 73 titles and ensured sustainability by building the capacity of the pluri-disciplinary team of 20 Ministry and university experts in literacy in all three Congolese languages and French. This team now forms a corps of master trainers that will remain in the DRC with the skills and knowledge to train trainers, directors, and teachers for years to come.

⁴ Average length of manuals/workbooks is 104 pages, completed with a perfect binding.

⁵ USAID / UKAID. (2018). “2018 Early Grade Reading Monitoring Assessment in the Democratic Republic of Congo.” https://pdf.usaid.gov/pdf_docs/PA00WFT6.pdf

⁶ Ibid.

MOVING FORWARD: KEYS TO SUCCESSFUL TLM SUPPLY CHAIN

A!l's innovative application of traditional supply chain processes and principles in the development and delivery of teaching and learning materials allowed the activity to provide more than 2.3 million quality books to directors, teachers, and students to date. Along the way, the project and its Ministry counterparts (*Direction des Programmes et Matériels Didactiques, Service National de Formation, Le Centre de Linguistique Appliquée de Kinshasa*) learned valuable lessons:

- **Designate a Supply Chain Manager** – For A!l, a cross-cutting TLM Task Force that met weekly to coordinate, share information, and decide on paths forward, served this role.
- **Standardization** – A!l adopted standardized titles, documents, and tools, to facilitate communication up and down the supply chain. For example, a design specification document for each title that includes: a framework of the content (scope and sequence, number of units/lessons) as well as the physical aspects (page number target window, paper weight, cover and binding type, color vs. black and white printing) can guide both the materials development team and the procurement team.
- **Forecasting** – Start with your delivery date and plan backwards. Detailed delivery plans can help and should include the specific package of materials to be delivered per student, teacher, director, and/or class. The plan should include timing (for teacher/director training before the year starts, or one month after school starts to allow student numbers to stabilize) and delivery location (at training sites, to schools, sub-districts, or provincial offices).
- **Logistics** – Determine logistics needs based on production and delivery plans.
 - Will TLMs will be printed domestically or internationally? A question of critical importance is: *Do domestic printers have the capability to print at the needed scale?* In many countries, this is not feasible. Each option has benefits and drawbacks, to be weighed based on the program's needs (see Figure 3).
 - Pop-up distribution centers and last mile distribution with MLs improved in full and on-time delivery of TLMs.

FIGURE 3. Domestic vs. international TLM production

